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D scription

The present invention relates to surgical suction tips such as are used to remove waste matter from the body during surgery.

In orthopaedic surgery, for example when replacing a hip joint, it is often necessary to clean out the centre of a bone, primarily the femur, prior to fitting the prosthesis, and it is common practice to utilise a suction tip and associated suction source to remove unwanted gelatinous blood, bone splinters, tissue and the like.

Such arrangements commonly comprise a suction source acting through a container and a length of tubing to the hand-held suction tip itself whereby solid and liquid waste are drawn through the suction tip, along the tubing and into the container.

However, the nature of the waste material so removed from a patient is such that the tip itself and the tubing therefrom are easily clogged by bits of tissue and other matter. It is then necessary to clean out the suction line or the suction tip before the operation can be continued and this is clearly a time-consuming and messy process.

It has been proposed to provide a surgical suction tip incorporating a removable filter element such as disclosed in US patent no. 4468217. However, the filter unit itself is of relatively complex construction, embodying on it, as well as the filter element, means for locating the input end of the filter element in position within the associated housing and closure means for enabling insertion and removal of the filter unit into and from the housing.

Furthermore, the waste material is drawn into an annular chamber within the housing before passing through the wall of the filter into the interior thereof and thence from the suction tip. Thus it will be appreciated that the solid matter of the waste material is retained within the annular chamber of the housing rather than in the filter element itself, and any clogging up of the suction tip requires not only removal and cleaning of the filter element but also cleaning out of the housing.

It would be desirable to be able to provide a surgical suction tip less likely to clog up and more easily cleaned than heretofore.

According to the present invention there is provided a surgical suction tip comprising a tubular body portion having a hollow, reduced-diameter tip portion at one end thereof the bore of which communicates into the interior of the body portion, a releasable cap portion closing the other end of the body portion and provided with a tubular connecting portion externally thereof the bore of which communicates through an aperture in the cap portion into the interior of the body portion, and a hollow filter member located within the body por-

tion to define a chamber of generally annular transverse section between the filter member and the inner wall of the body portion, the filter member being provided with a plurality of apertures therein interconnecting the interior of the filter member with said annular chamber, characterised in that the body portion has integrally formed therein, adjacent the tip portion thereof, location means to receive thereon and locate one end of the filter member within the body portion such that material entering the body portion through the tip portion flows into the hollow interior of the filter member, the other end of the filter member being closed, and the annular chamber within the body portion being in communication with the tubular connecting portion by way of said aperture in the cap portion.

It will thus be appreciated that liquid and solid matter enter the surgical suction tip through the tip portion thereof and are drawn into the interior of the filter member. The liquid content thereof continues to flow through the apertures in the filter member into the annular chamber and thence through the tubular connecting portion for collection, while the solid matter is retained within the hollow interior of the filter member.

As soon as the filter member is blocked by the solid matter, it can readily be removed from the body portion, cleaned out and replaced for further use of the surgical suction tip.

Thus the surgical suction tip of the invention provides a controlled build-up of solid matter in a predetermined location combined with ready disposal of said matter quickly and with little mess.

Preferably the filter location means comprises a tubular member extending co-axially within the body portion, the bore thereof forming a continuation of the bore through the tip portion, the one end of the filter member being a push-fit over said tubular member.

The tubular member may be provided with a plurality of circumferentially-spaced, axially extending ribs on the outer wall thereof for abutment by the one end of the filter member to locate said filter member axially relative to the tubular member and therefore to the body portion.

Conveniently the filter member further comprises a removable end cap located in, to close, the other end of the filter member, said end cap including a tapering annular skirt portion the free end of which is gripped between the other end of the body portion and the cap portion to locate said end cap in an operative position within the body portion, a plurality of apertures through the skirt portion of the end cap interconnecting the annular chamber within the body portion with the tubular connecting portion by way of the aperture in the cap portion.

Preferably the cap portion is internally threaded

to be a screw-fit on the correspondingly externally threaded other end of the body portion.

The surgical suction tip may be of a rigid transparent plastics material such as styrene acrylic nitrite, and may be provided with a plurality of tubular extension pieces of different shapes and lengths each of which is a friction push-fit into the free end of the tip portion thereof.

By way of example only an embodiment of the invention will now be described in greater detail with reference to the accompanying drawing which is a longitudinal section through a surgical suction tip according to the invention.

Referring to the drawing, the illustrated surgical suction tip comprises a tubular body portion indicated generally at 2 and including a cylindrical main extent 4 and a tapering tip portion 6 at one end thereof having a central bore 8 therethrough communicating into the interior of the main extent 4. The main extent 4 of the body portion 2 tapers slightly with its internal diameter increasing gradually from the one end thereof to the other end thereof.

The other end of the main extent 4 of the body portion 2 is externally threaded at 10 and is closed by means of an internally-threaded end cap 12. Said end cap 12 has integrally formed therewith an external, axially extending connecting tube 14 the bore 16 in which communicates through the end cap 12. A plurality of circumferentially-spaced strengthening fins 18 are provided between the connecting tube 14 and the end cap 12.

Integrally formed within the one end of the body portion 2 is a tubular locating sleeve 20 extending from the tip portion 6 into the main extent 4, the bore 22 of said locating sleeve 20 forming an axial continuation of the bore 8 of the tip portion 6 and interconnecting said bore 8 with the hollow interior of the main extent 4 of the body portion 2.

The free end of the sleeve 20 is chamfered, while a plurality of circumferentially spaced, axially extending ribs 24 are provided on the external surface of the sleeve 20 to terminate short of the free end of said sleeve 20.

The surgical tip further comprises a hollow filter element 26 of generally cylindrical shape, the filter element tapering slightly from one end to the other with the wider one end extent 28 being a push fit over the sleeve 20 to locate said element laterally in position within the body portion 2. The free end of the filter element 26 abuts the ends of the ribs 24 of the sleeve 20 to determine the axial operative position of the filter element 26 within the body portion 2.

In said operative position, the filter element 26 defines, together with the inner wall of the body portion 2, an annular chamber 30 within the body

portion 2, a plurality of holes 31 through the cylindrical wall of the filter element 26 interconnecting the hollow interior of said filter element 26 with said annular chamber 30. The bore 8 of the tip portion 6 communicates into said hollow interior of the filter element 26 by way of the bore 22 in the tubular locating sleeve 20. The tapering natures of the main extent 4 of the body portion 2 and the filter element 26 are such that the transverse cross-sectional area of the annular chamber 30 increases in size from the one end of the main extent 4 to the other end thereof.

A cap portion indicated generally at 32 is a close push-fit into the narrower other end extent 34 of the filter element 26 such that an end wall 36 of the cap portion seals and closes said other end of the filter element 26.

Integrally formed with the end wall 36 of the cap portion 32 is an annular, outwardly-tapering skirt portion 38 the free end of which is provided with an annular flange 40 adapted to locate the cap portion in the open other end of the main extent of the body portion 2 and to be gripped in sealing engagement between the end cap 12 and the body portion 2 when the end cap 12 is screwed onto said body portion 2.

The skirt portion 38 is provided with a plurality, for example four, of circumferentially spaced apertures 42 therethrough to interconnect the annular chamber 30 within the body portion 2 with the bore 16 of the connecting tube 14.

Conveniently the surgical suction tip, including the filter element 26, is moulded from a rigid, translucent plastics material such as styrene acrylic nitrite, while the tip is provided with a plurality of relatively flexible tubular extension pieces of different lengths and shapes one end of each of which is adapted to be a close fit in the free end of the tip portion 6 of the surgical suction tip. One such extension piece is shown at 44.

The described device operates as follows. A length of tubing attached to the connecting tube 14 feeds to a container (not shown) to which is also connected a suction source whereby said source exerts a suction effect on the extension piece 44 located in the tip portion 6 of the surgical tip.

Thus extraneous waste material adjacent the free end of the extension piece 44 is drawn into the surgical tip along paths defined by the arrows in the drawing, through the length of tubing connected to the tube 14 and is collected in the container.

Clearly the liquid content of said waste matter can pass through the holes 31 in the filter element 26 and can be drawn into the container. However, gelatinous or solid matter such as bone splinters, tissue and the like, which heretofore have been prone to clogging up establish d suction tip sys-

tems, cannot pass through the holes 31 and are therefor collected within the hollow interior of the filter element 26, the build-up of such matter beginning at the other end of the filter element 26 adjacent the end wall 36 of the cap portion 32 and continuing along the filter element 26 towards the one end thereof.

Once the filter element is itself substantially full of waste matter and liquid flow therethrough is substantially prevented, the end cap 12 is unscrewed from the body portion 2, the filter element 26 and attached cap portion 32 are withdrawn therefrom, the cap portion 32 is removed from the filter element 26 and the filter element is cleaned out.

Assembly of the surgical tip is the reverse of the above procedure, with the sleeve 20 serving to guide the filter element 26 into its operative position within the body portion 2.

Thus it will be appreciated that a surgical suction tip according to the invention encourages blocking thereof but in a controlled manner and in a predetermined location, and whereby unblocking of the system can be effected quickly and with little mess, requiring only removal, cleaning and replacement of the filter element 26.

Claims

1. A surgical suction tip comprising a tubular body portion (2) having a hollow, reduced-diameter tip portion (6) at one end thereof the bore (8) of which communicates into the interior of the body portion (2), a releasable cap portion (12) closing the other end of the body portion (2) and provided with a tubular connecting portion (14) externally thereof the bore (16) of which communicates through an aperture in the cap portion (12) into the interior of the body portion (2), and a hollow filter member (26) located within the body portion (2) to define a chamber (30) of generally annular transverse section between the filter member (26) and the inner wall of the body portion, the filter member (26) being provided with a plurality of apertures (31) therein interconnecting the interior of the filter member (26) with said annular chamber (30), characterised in that the body portion (2) has integrally formed therein, adjacent the tip portion (6) thereof, location means (20) to receive thereon and locate one end (28) of the filter member (26) within the body portion (2) such that material entering the body portion (2) through the tip portion (6) flows into the hollow interior of the filter member (26), the other end (34) of the filter member (26) being closed, and the annular chamber (30) within the body portion (2) being in

communication with the tubular connecting portion (14) by way of said aperture in the cap portion 12.

- 5 2. A surgical suction tip as claimed in claim 1 in which the filter location means comprises a tubular member (20) extending coaxially within the body portion (2), the bore (22) thereof forming a continuation of the bore (8) through the tip portion (6), the one end (28) of the filter member (26) being a push-fit over said tubular member (20).
- 10 3. A surgical suction tip as claimed in claim 2 in which the tubular member (20) is provided with a plurality of circumferentially-spaced, axially extending ribs (24) on the outer wall thereof for abutment by the one end (28) of the filter member (26) to locate said filter member (26) axially relative to the tubular member (20) and therefore to the body portion (2).
- 15 4. A surgical suction tip as claimed in any one of claims 1 to 3 in which the filter member (26) further comprises a removable end cap (32) located in, to close, the other end (34) of the filter member (26), said end cap (32) including a tapering annular skirt portion (38) the free end (40) of which is gripped between the other end of the body portion (2) and the cap portion (12) to locate said end cap (32) in an operative position within the body portion (2), a plurality of apertures (42) through the skirt portion (38) of the end cap (32) interconnecting the annular chamber (30) within the body portion (2) with the tubular connecting portion (14) by way of the aperture in the cap portion (12).
- 20 5. A surgical suction tip as claimed in any one of claims 1 to 4 in which the cap portion (12) is internally threaded to be a screw-fit on the corresponding externally threaded (10) other end of the body portion (2).

Patentansprüche

1. Chirurgische Absaugspitze, die einen röhrenförmigen Körperabschnitt (2) mit einem hohlen Spitzenabschnitt (6) mit verringertem Durchmesser am einen Ende davon aufweist, dessen Bohrung (8) eine Verbindung in das Innere des Körperabschnitts (2) darstellt, sowie einem lösbar Kappeabschnitt (12), der das andere Ende des Körperabschnitts (2) verschließt und außerhalb davon mit einem röhrenförmigen Verbindungsabschnitt (14) versehen ist, dessen Bohrung (16) durch ein Öffnung im Kappenabschnitt (12) eine Verbindung in das Innere

des Körperelements (26), das innerhalb des Körperabschnitts (2) angeordnet ist, um eine Kammer (30) mit im allgemeinen ringförmigem Querschnitt zwischen dem Filterelement (26) und der Innenwand des Körperabschnitts zu begrenzen, wobei das Filterelement (26) mit einer Vielzahl von Öffnungen (31) darin versehen ist, die das Innere des Filterelements (26) mit der genannten ringförmigen Kammer (30) verbinden, dadurch gekennzeichnet, daß der Körperabschnitt (2) integral darin an dem Spitzenabschnitt (6) davon angrenzende Mittel zur örtlichen Festlegung bzw. Anordnungsmittel (20) ausgebildet hat, um ein Ende (28) des Filterelements (26) darauf aufzunehmen und es innerhalb des Körperabschnitts (2) anzurichten, bzw. örtlich festzulegen, sodaß Material, das in den Körperabschnitt (2) durch den Spitzenabschnitt (6) eintritt, in das hohle Innere des Filterelements (26) fließt, wobei das andere Ende (34) des Filterelements (26) geschlossen ist, und wobei die ringförmige Kammer (30) innerhalb des Körperabschnitts (2) durch die genannte Öffnung im Kappenabschnitt (12) mit dem röhrenförmigen Verbindungsabschnitt (14) in Verbindung steht.

2. Chirurgische Absaugspitze nach Anspruch 1, bei der das Filteranordnungsmittel bzw. Mittel zur örtlichen Festlegung ein röhrenförmiges Element (20) umfaßt, das sich koaxial innerhalb des Körperabschnitts (2) erstreckt, wobei dessen Bohrung (22) eine Fortführung der Bohrung (8) durch den Spitzenabschnitt (6) bildet und das eine Ende (28) des Filterelements (26) eine Schiebepassung bzw. einen Stecksitz über das genannte röhrenförmige Element (20) darstellt.
3. Chirurgische Absaugspitze nach Anspruch 2, bei der das röhrenförmige Element (20) mit einer Vielzahl um die Umfangslinie im Abstand voneinander angeordneter sich axial erstreckender Rippen (24) an der Außenwand davon versehen ist, sodaß das eine Ende (28) des Filterelements (26) daran angrenzt bzw. anstößt, um das genannte Filterelement (26) axial relativ zum röhrenförmigen Element (20) und deshalb zum Körperabschnitt (2) anzurichten bzw. örtlich festzulegen.
4. Chirurgische Absaugspitze nach einem der Ansprüche 1 bis 3, bei der das Filterelement (26) weiters eine abnehmbare Endkappe (32) aufweist, die im anderen Ende (34) des Filterelements (26) angeordnet ist, um es zu verschließen, wobei die genannte Endkappe (32) einen

5 sich verjüngend in ringförmigen Einfassungsabschnitt (38) inschließt, dessen freies Ende (40) zwischen dem anderen Ende des Körperabschnitts (2) und dem Kappenabschnitt (12) gehalten wird, um die genannte Endkappe (32) 10 in einer Betriebsposition innerhalb des Körperabschnitts (2) anzurichten bzw. örtlich festzulegen, wobei eine Vielzahl von Öffnungen (42) durch den Einfassungsabschnitt (38) in der Endkappe (32) die ringförmige Kammer (30) innerhalb des Körperabschnitts (2) durch die Öffnung im Kappenabschnitt (12) mit dem röhrenförmigen Verbindungsabschnitt (14) zusammenhängt bzw. verbindet.

- 15 5. Chirurgische Absaugspitze nach einem der Ansprüche 1 bis 4, bei der der Kappenabschnitt (12) ein Innengewinde aufweist, sodaß er eine Schraubpassung am entsprechenden mit Außen Gewinde (10) versehenen anderen Ende 20 des Körperabschnitts (2) darstellt.

Revendications

- 25 1. Tête d'aspiration chirurgicale comprenant une portion de corps tubulaire (2) possédant une portion de tête creuse (6) à diamètre réduit à l'une de ses extrémités dont le percage (8) communique avec l'intérieur de la portion de corps (2), une portion de capuchon amovible (12) fermant l'autre extrémité de la portion de corps (2) et pourvue d'une portion de connexion tubulaire (14) à l'extérieur de celle-ci dont le percage (16) communique à travers une ouverture dans la pointe de capuchon (12) avec l'intérieur de la portion de corps (2), et un élément filtrant creux (26) localisé à l'intérieur de la portion de corps (2) pour définir une chambre (30) de section transversale généralement annulaire entre l'élément filtrant (26) et la paroi interne de la portion de corps, l'élément filtrant (26) présentant une pluralité d'ouvertures (31) à l'intérieur interconnectant l'intérieur de l'élément filtrant (26) avec ladite chambre annulaire (30) caractérisée en ce que la portion de corps (2) présente, intégralement formés à l'intérieur de celle-ci, adjacente à sa portion de tête (6), des moyens de localisation (20) destinés à recevoir sur ceux-ci et à localiser une extrémité (28) de l'élément filtrant (26) à l'intérieur de la portion de corps (2) de sorte qu'une matière entrant dans la portion de corps (2) à travers la portion de tête (6) s'écoule dans l'intérieur creux de l'élément filtrant (26) l'autre extrémité (34) de l'élément filtrant (26) étant fermée, et la chambre annulaire (30) à l'intérieur de la portion de corps (2) étant en communication avec la portion de connexion tubu- 30 35 40 45 50 55

lair (14) au moyen d'ladite ouvertur dans la portion de capuchon (12).

2. Tête d'aspiration chirurgicale selon la revendication 1, dans laquelle le moyen de localisation de filtre comprend un élément tubulaire (20) s'étendant coaxialement à l'intérieur de la portion de corps (2) dont le perçage (22) forme une continuation du perçage (8) à travers la portion de tête (6), une extrémité (28) de l'élément filtrant (26) étant ajustée par poussée sur ledit élément tubulaire (20). 5

3. Tête d'aspiration chirurgicale selon la revendication 2, dans laquelle l'élément tubulaire (20) présente une pluralité de nervures (24) espacées circonférentiellement, s'étendant axialement sur sa paroi externe en vue de la butée par une extrémité (28) de l'élément filtrant (26) pour localiser ledit élément filtrant (26) axialement par rapport à l'élément tubulaire (20) et donc à la portion de corps (2). 10 15

4. Tête d'aspiration chirurgicale selon l'une des revendications 1 à 3, dans laquelle l'élément filtrant (6) comprend en outre un capuchon extrême amovible (32) localisé, pour la fermer, dans l'autre extrémité (34) de l'élément filtrant (26), ledit capuchon extrême (32) comprenant une portion formant collerette éfillée annulaire (38) dont l'extrémité libre (40) est saisie entre l'autre extrémité de la portion de corps (2) et la portion de capuchon (12) afin de localiser ledit capuchon extrême (32) dans une position fonctionnelle à l'intérieur de la portion de corps (2), une pluralité d'ouvertures (42) à travers la portion formant collerette (38) du capuchon extrême (32) interconnectant la chambre annulaire (30) à l'intérieur de la portion de corps (2) avec la portion de connexion tubulaire (14) au moyen de l'ouverture dans la portion de capuchon (12). 20 25 30 35

5. Tête d'aspiration chirurgicale selon l'une des revendications 1 à 4 dans laquelle la portion de capuchon (12) est taraudée pour un ajustement par vissage sur l'autre extrémité filetée extérieurement (10) correspondante de la portion de corps (2). 40 45

